

## PATENT COOPERATION TREATY

## PCT



## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ACH 3019 WO	FOR FURTHER ACTION		See Form PCT/A/416
International application No. PCT/EP2004/011457	International filing date (day/month/year) 12.10.2004	Priority date (day/month/year) 15.10.2003	
International Patent Classification (IPC) or national classification and IPC C10G11/04, C10G11/05, C10G11/18, B01J23/10			
Applicant ALBEMARLE NETHERLANDS B.V.			

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>sent to the applicant and to the International Bureau</i>) a total of sheets, as follows:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only)</i> a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>	

Date of submission of the demand 06.05.2005	Date of completion of this report 27.09.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Zuurdeeg, B Telephone No. +31 70 340-



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## Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- international search (under Rules 12.3 and 23.1(b))
  - publication of the international application (under Rule 12.4)
  - international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements\*** of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

## Description, Pages

1-10 as originally filed

## Claims, Numbers

1-9 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
- the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (specify):
  - any table(s) related to sequence listing (specify):

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (specify):
- any table(s) related to sequence listing (specify):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-9
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following document:

D1: WO-A-0112570

2. The present application does not meet the requirements of Article 33(1) PCT, because the subject-matter of claims 1-9 does not involve an inventive step in the sense of Article 33(3) PCT in view of document D1.
  - 2.1 The subject-matter of independent claim 1 is novel, since the combination of features is not disclosed in any of the available prior art documents.

Therefore, claims 1-9 fulfill the requirements of Article 33(2) PCT.

- 2.2 Document D1, which is considered to represent the most relevant state of the art, discloses crystalline anionic clay containing bodies from which the subject-matter of independent claim 1 differs in that the composition comprises FCC catalyst particles and additive particles, wherein the additive particle comprises Y-type zeolite.

There is currently no evidence on file to support any unexpected effects or properties in relation to the above identified difference, since in example 2 REY exchanged with 12 wt% rare earth is used (instead of Y-type zeolite). The nature of the comparison with the closest prior art should have been such that the effect is convincingly shown to have its origin in the **distinguishing feature of the invention**.

Alleged but unsupported advantages cannot be taken into consideration in respect of the determination of the problem underlying the application.

Besides, in claim 1 the amount of Y-type zeolite is not defined; the amount ranges from practically 0 wt% to almost 100 wt% of the additive composition. No unexpected effect has been shown over the whole breadth of scope.

In view of the above, the problem underlying the invention (see page 1, lines 28-29 of

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the current specification) has to be reformulated and may be regarded as to provide a further composition.

D1 discloses that the crystalline anionic clay containing bodies may contain molecular sieve material, e.g. zeolite Y, ZSM-5 etcetera; the multifunctional bodies can be used as a catalyst additive (see page 10, lines 20-29).

The suitability of anionic clay containing shaped bodies for the **removal of SO<sub>x</sub>** and/or **NO<sub>x</sub> compounds** in FCC may be improved by addition of Ce and/or V (see page 10, lines 11-13). In several examples of D1, the bodies were tested as an FCC additive.

Therefore, it is not possible to recognise an inventive step for claims 1 and 9 and the subject-matter of claims 1 and 9 does not fulfill the requirements Article 33(3) PCT.

- 2.3 The process for preparing a composition as is defined in independent claim 6 is obvious in light of D1 and the problem underlying said claim.

Document D1 discloses (see page 10, lines 20-26) that the anionic clay bodies can be combined with conventional catalyst components such as alumina, silica-alumina and zeolites (e.g. Y and ZSM-5). Additives, e.g. Ce, La and Cu, can be deposited on the shaped bodies before, during or after aging (page 9, line 24-page 10, line 13). The conventional catalyst components can be added prior to the shaping step, e.g. spray drying (see page 8, lines 4-13; page 10, lines 25-26).

The subject-matter of claim 6 does therefore not involve an inventive step as required by Article 33(3) PCT.

- 2.4 The subject-matter of dependent claims 2-5, 7 and 8 do not contain subject-matter which could contribute to an inventive step being recognisable over the prior art cited, since the specification does not provide any unexpected effects or advantages associated with any of the differentiating features of the claims.

The subject-matter of dependent claims 2-5, 7 and 8 therefore lacks an inventive step

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(Article 33(3) PCT).

**Re Item VIII**

**Certain observations on the international application**

- 8.1 The term "solid solution" used in claim 1 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.

For the establishment of this opinion, the definition as given on page 3, lines 9-17, i.e. a disordered MgO-like product distinguishable from spinel and anionic clays, has been used to interpret the claim.

- 8.2 The feature of claim 2, that a REY zeolite is comprised in an amount of about 2-10 wt%, is not referred to in the description. Claim 2 is therefore not supported by the description as required by Article 6 PCT.